

Citizen Science in OCNMS

COASST and NOAA Marine Debris Monitoring

By: Heidi Pedersen
Citizen Science Coordinator



Major Threats

- Introduced species
- Habitat loss/change
- Exploitation
- Fisheries interactions: competition, bycatch
- Pollution, plastics & contaminants
- Disease
- Disturbance
- CO₂ impacts: warming, acidification

So What Is Citizen Science?

BAY AREA ANT SURVEY



WSU BEACH WATCHERS
Informed. Engaged. Passionate.



BirdTrack

Recording birds across Britain and Ireland



Taking part Latest results About bird recording Recording year Partner websites

The Kansas Biological Survey, University of Kansas



**Monarch
Watch**

Dedicated to Education, Conservation, & Research

eBird

Frogwatch USA™
-Home

Help scientists conserve frogs and toads
in twenty minutes a week!

Project BudBurst

A National Phenology Network Field Campaign for Citizen Scientists

Free Choice Learning

Lifelong, Lifewide Learning

Public Participation in Scientific Research

Community-based Science

Citizen Science

Choosing the “what” “where” and “why” of learning.



Coastal Observation And Seabird Survey Team



What is COASST?

- COASST is a citizen science project of the University of Washington in partnership with state, tribal, and federal agencies, environmental organizations, and community groups.
- Volunteers survey beaches monthly in several states using beach-cast bird carcasses as environmental indicators.
- Volunteers also collect data on oil, dogs, humans and vehicles on beaches.

COASST Mission - empower citizens to monitor and protect coastal environmental health

Rigorous Citizen Science

A contract between scientists and citizens to **collect, verify, analyze** and **report** out rigorous, high quality data of direct relevance to natural resource management, conservation, and environmental health and quality.

Citizen Science

and Coastal Conservation

observation

citizens



assessment

scientists



public education

scientists & citizens

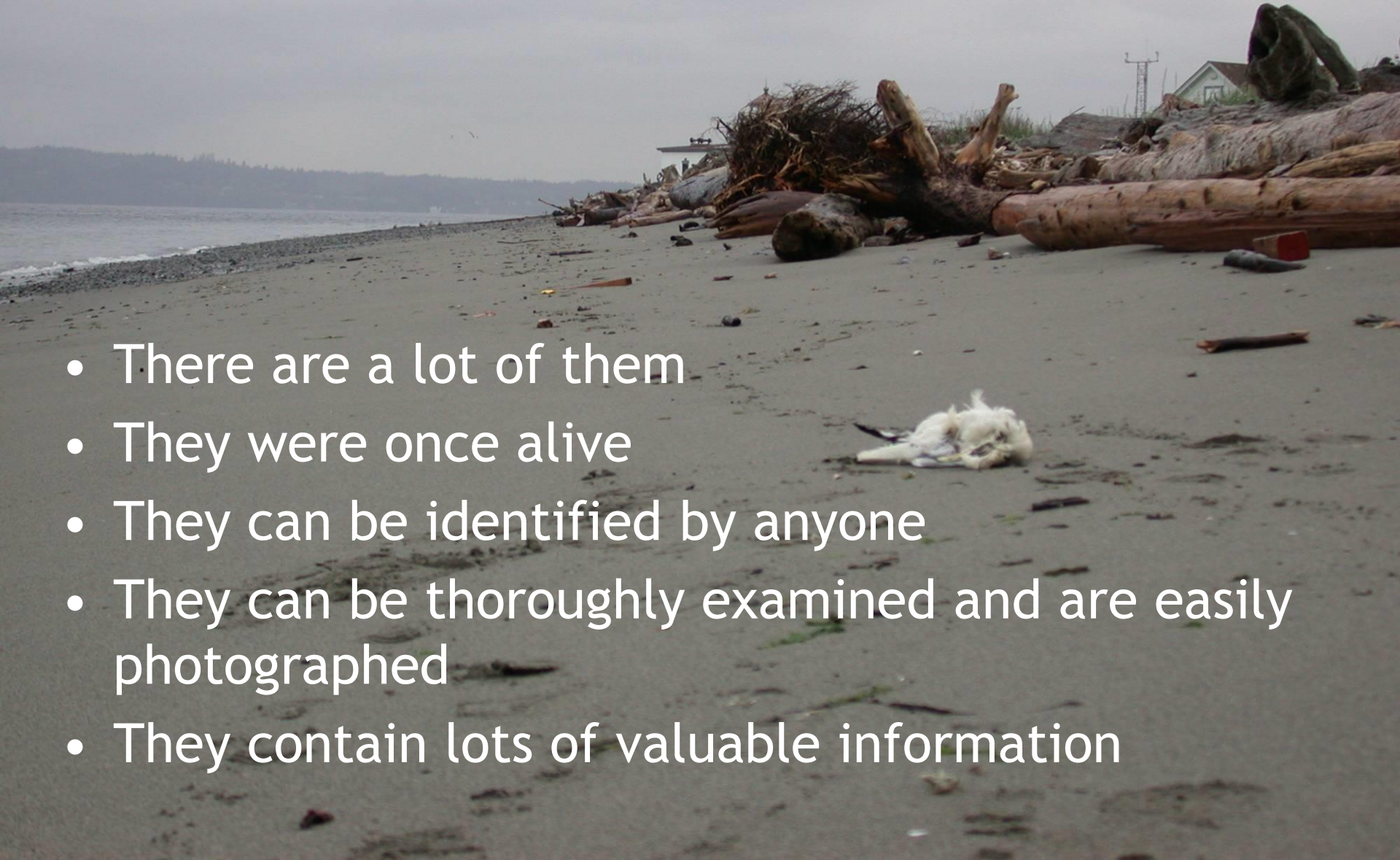


change

citizens

Why Document *Dead* Birds?

- There are a lot of them
- They were once alive
- They can be identified by anyone
- They can be thoroughly examined and are easily photographed
- They contain lots of valuable information



Seabirds as Indicators

- More than 100 species utilize marine ecosystems in the Pacific Northwest
- Long-lived
- Feed across many food chain levels
- Occur over many marine habitats



and people love them...

How Does COASST Work?

- Recruit and train local citizens
- Arm them with a rigorous protocol, field guide, and datasheets



BEACHED BIRDS

A COASST Field Guide

Todd Hass
Julia K. Parrish

COASTAL OBSERVATION AND SEABIRD SURVEY TEAM
DATA SHEET

PROGRAM DATA - DO NOW!

Observer: _____ Date: _____
Data Collector: _____
Region: _____
Beach Name: _____

PHYSICAL DATA - DO IN THE FIELD

Weather: _____
Wind Present: _____
Wave Present: _____
Human Data - DO ON RETURN LOG

Comments: _____



- Web-based “smart” data input
- Final verification by experts



- Data analyzed and presented

COASST

COASTAL OBSERVATION AND SEABIRD SURVEY TEAM

WHAT'S COASST?

GET INVOLVED

COASSTAL NEWS

FIND A BEACH

BEACHED BIRD PATTERNS

VOLUNTEER TOOLBOX

CONTACT US

MAKE A GIFT TO COASST

SITE MAP

Who is COASST?



800+ Volunteers!!!

Occupations:

Retired	30%
Biologist	25%
Manager	15%
Education	12%
Student	4%
Medicine	4%
Other	10%

average age = 51
(range=13-90)



Who is COASST?



Dr. Julia Parrish
Executive Director



Jane Dolliver
Program Coordinator



Liz Mack
Volunteer Coordinator



Charlie Wright
Data Verifier

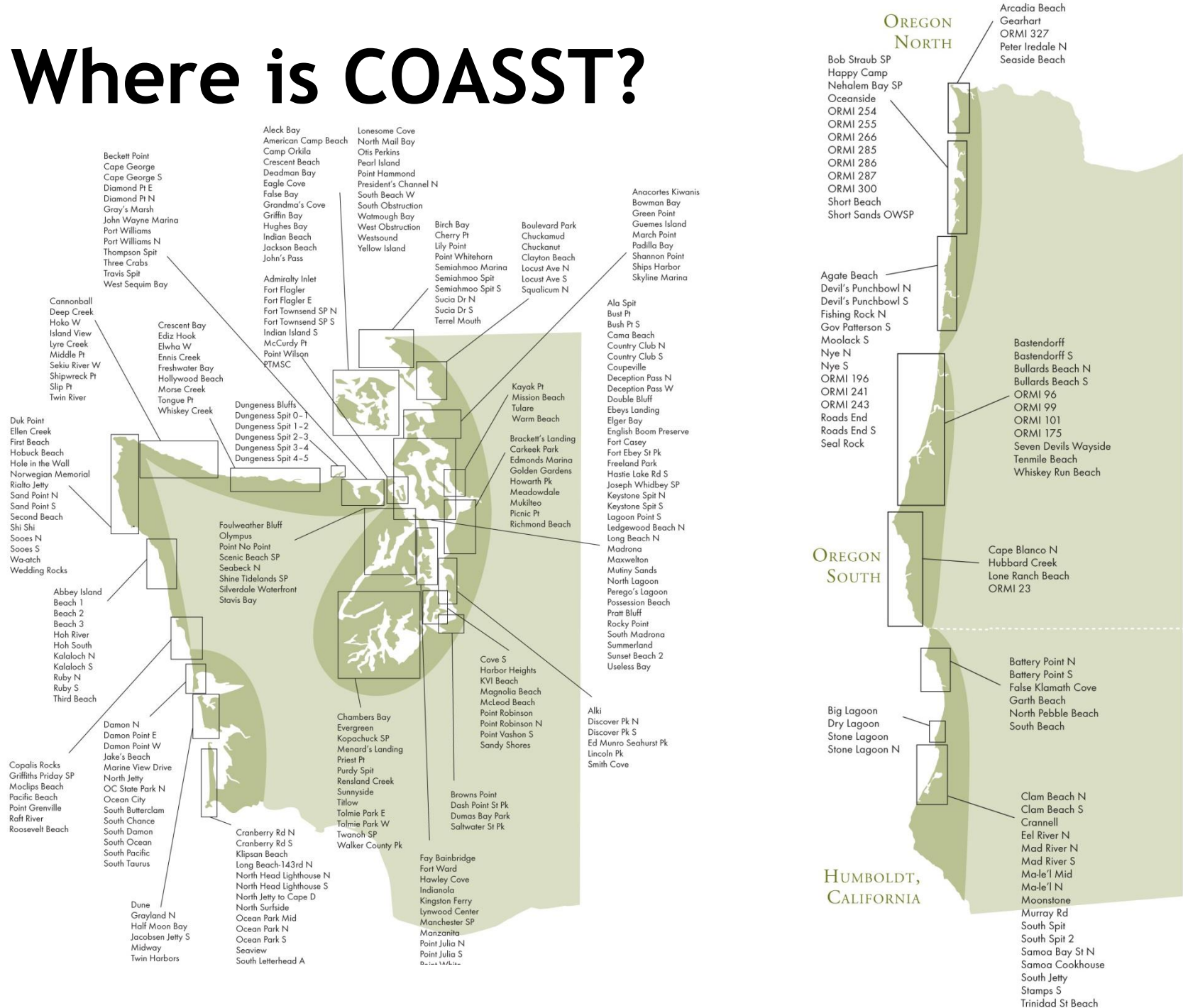


Student Interns



Heidi Pedersen
Olympic Coast NMS Partner

Where is COASST?

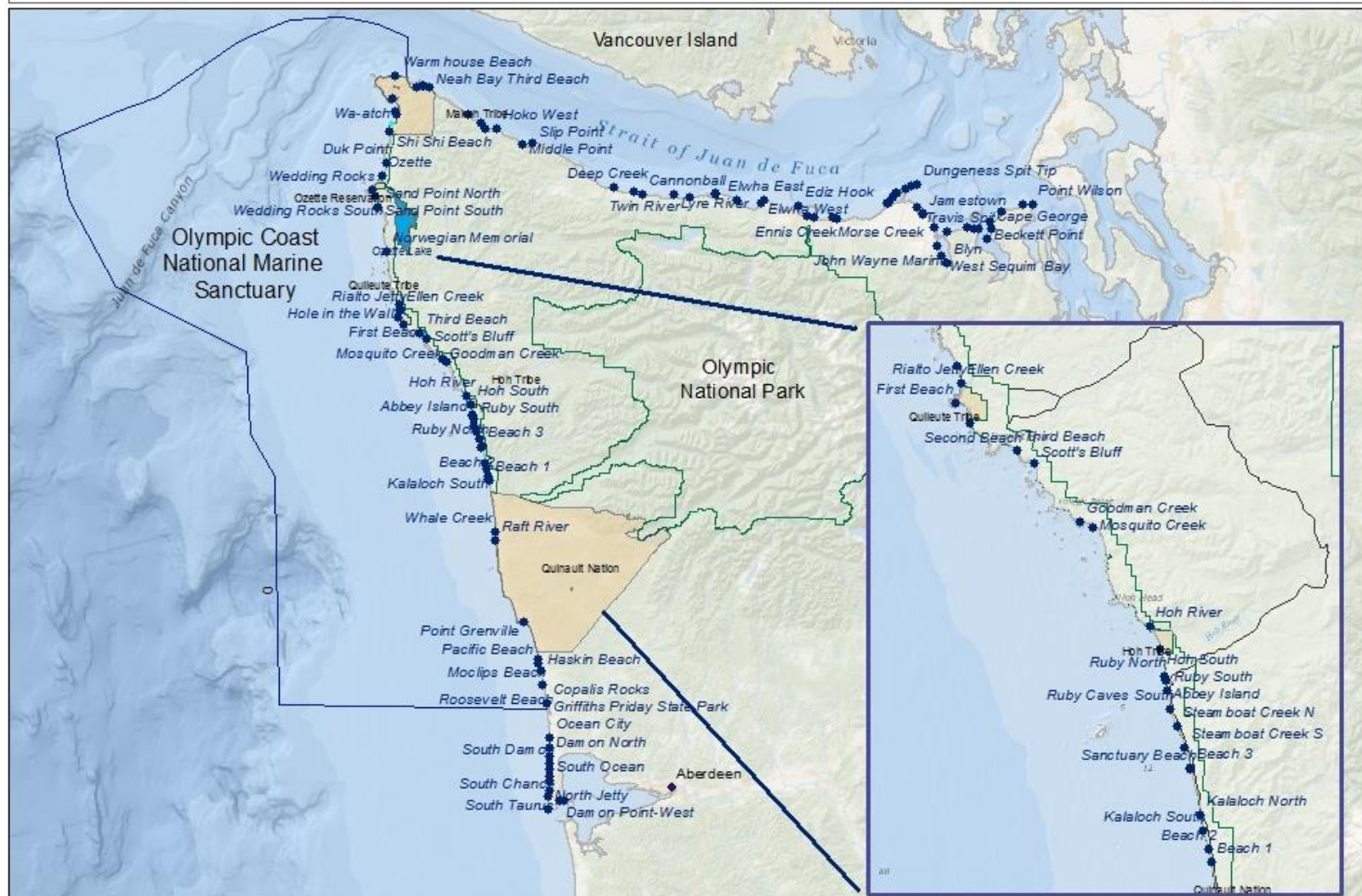


Where is COASST?





COASST Monitoring Sites



● Coastal Observation & Seabird Survey Team Monitoring Site (COASST)



0 5 10 20 Nautical Miles

0 20 40 80 Kilometers

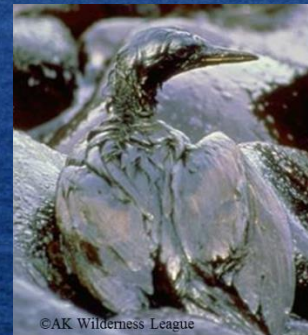
So What?!

Using Beached Bird Data

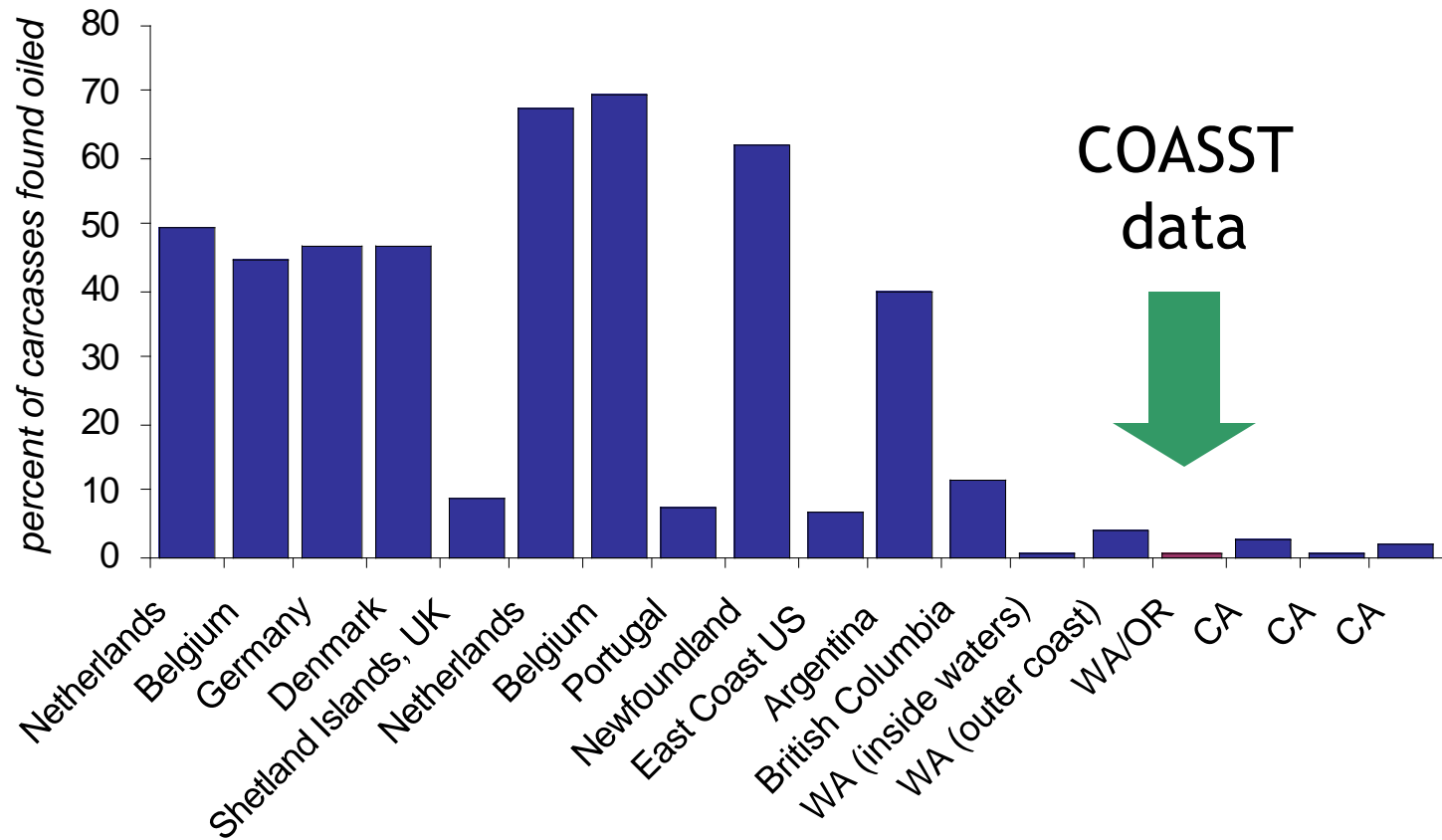
- Oil spill baseline
- Defining “normal”



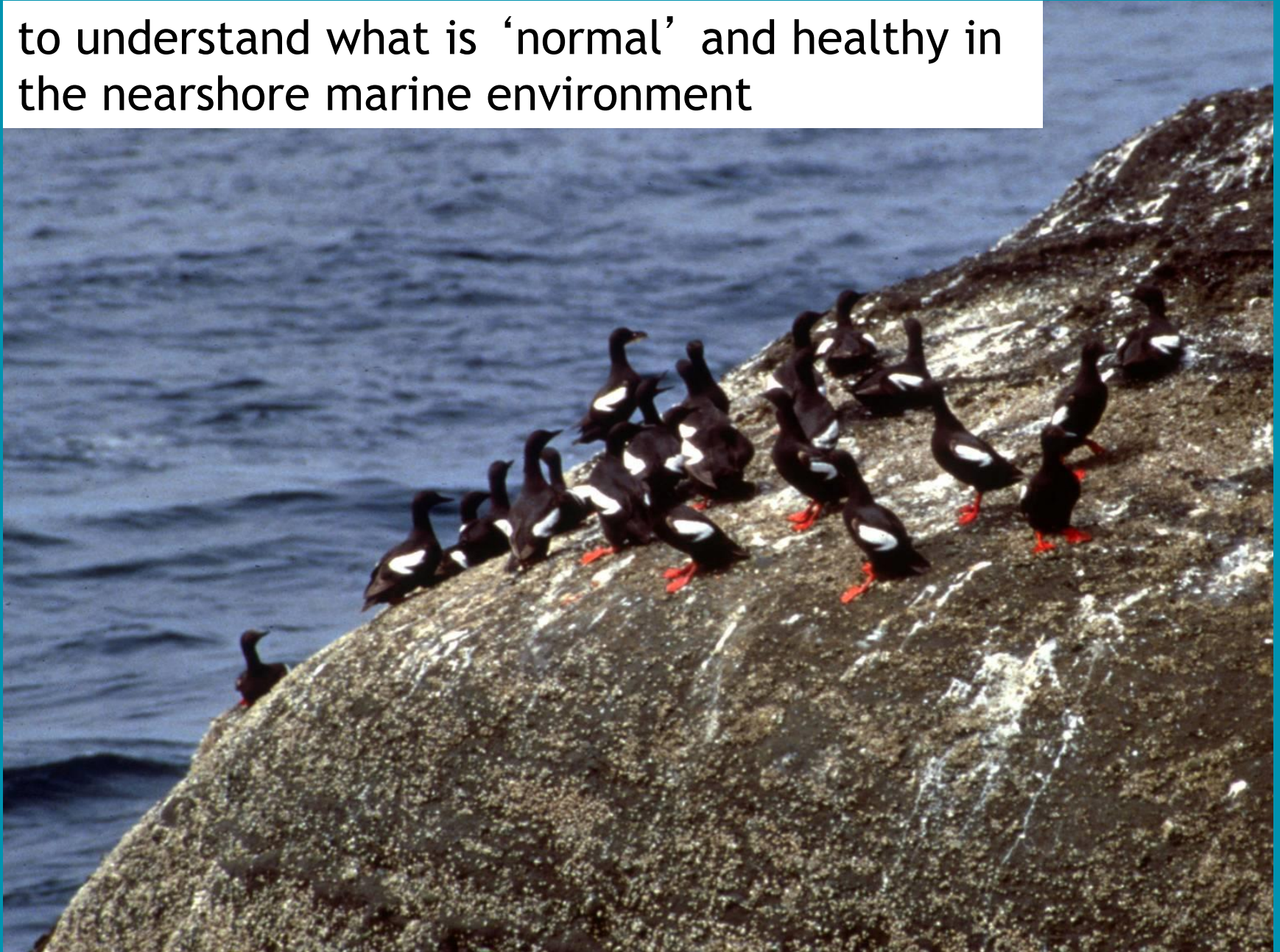
to monitor
oil pollution

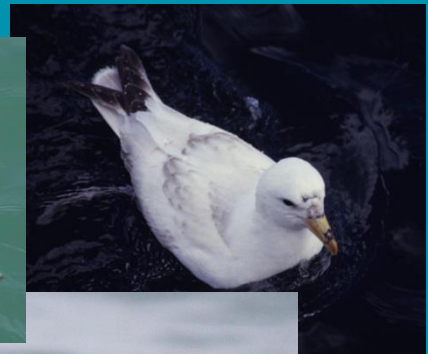
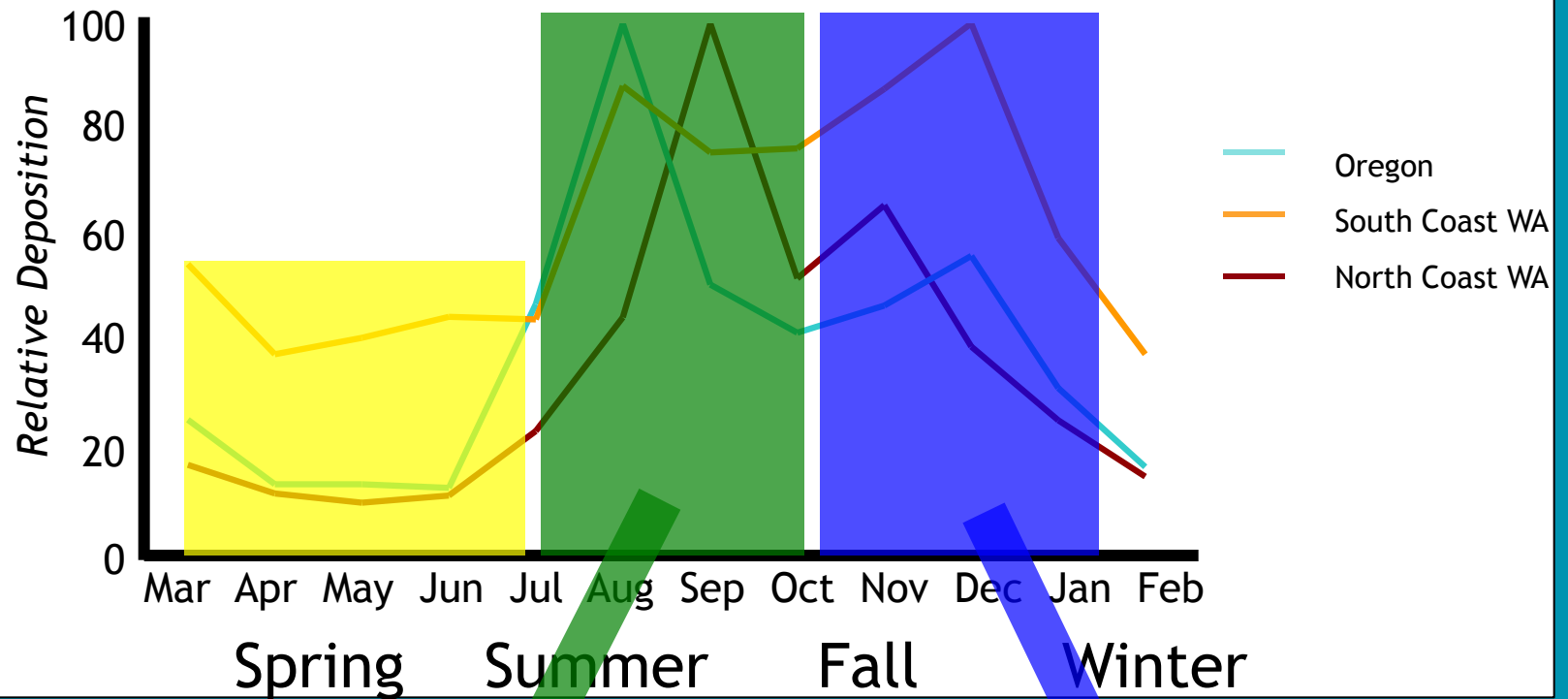


Chronic Oiling

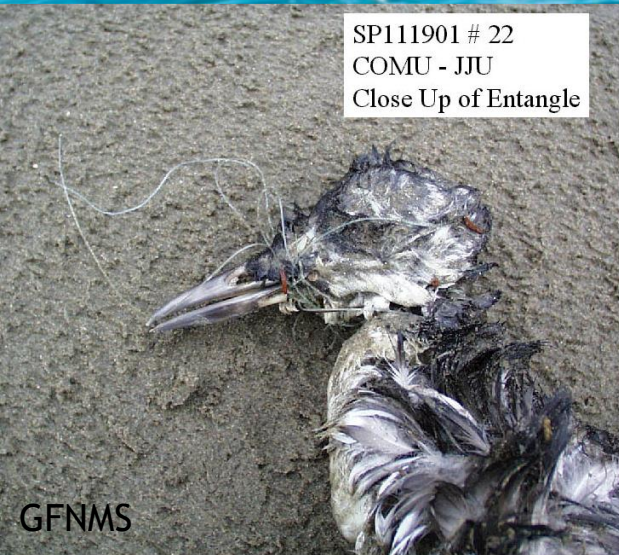


to understand what is 'normal' and healthy in the nearshore marine environment



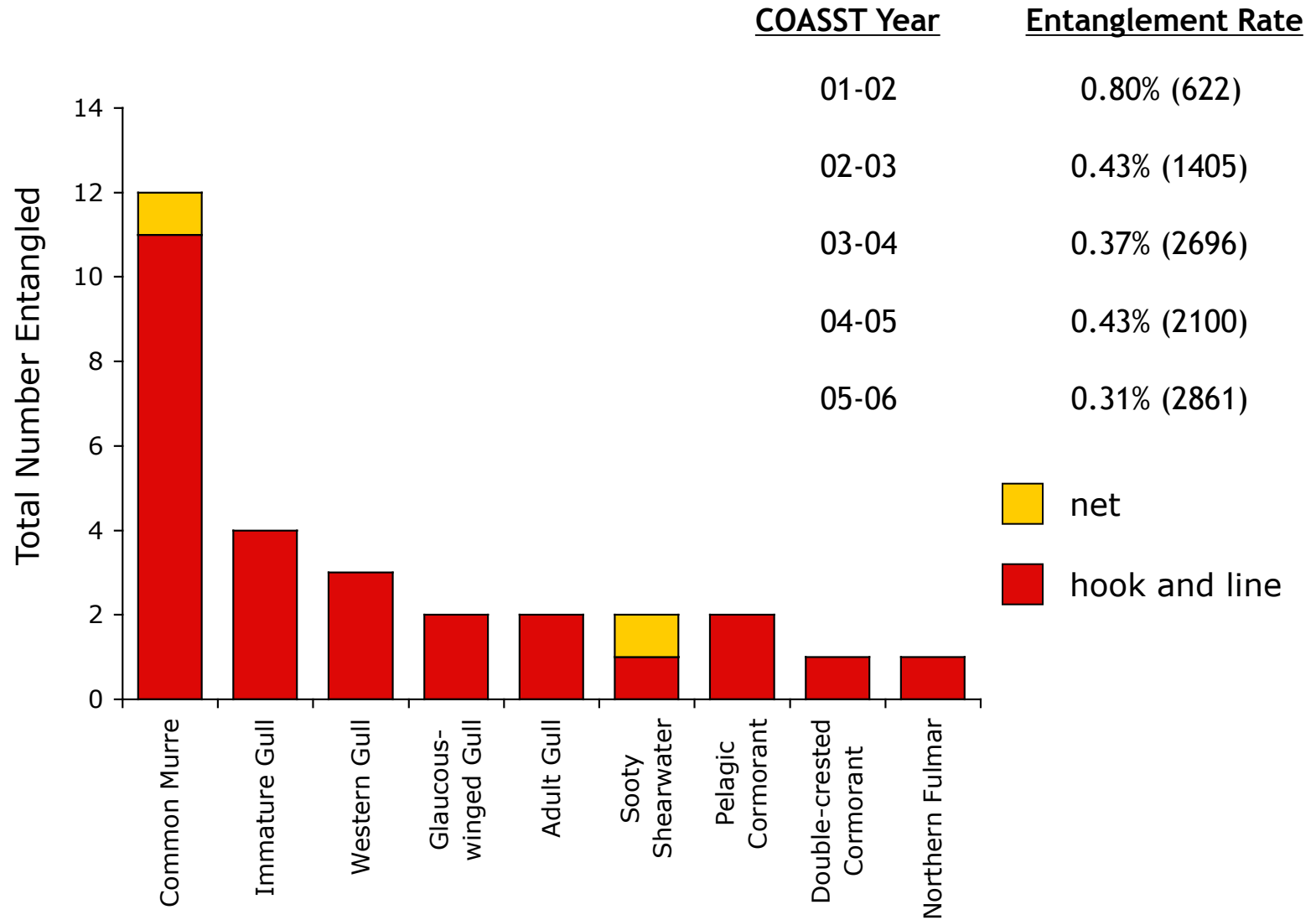


to monitor fisheries
interactions

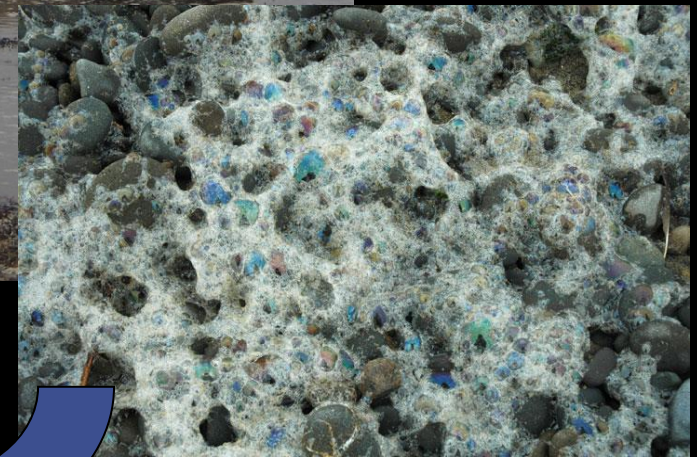
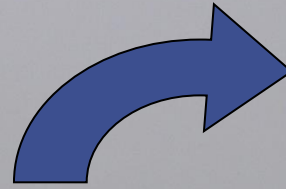


Alan Burger

COASST Entanglement



Harmful Algal Bloom 2009



top lf - Tom Horton; top rt - Brian Bill, NOAA; bottom - Chris Cook, Forks Forum



Cassin's Auklet *Ptychoramphus aleuticus*

- short, stout dark bill with a pale spot on the base of their lower bill
- blue/gray feet
- small (7oz. or 200g); flying tennis ball
- white crescents above and below the eye
- gray underwings with a pale central band
- adult has white eye; immature has a brown eye.



Cassin's Auklet

Ptychoramphus aleuticus

Diet: crustaceans, fish

Population Size: ~3.5 Million

Population Center: British Columbia, the Scott Island group, off the NW tip of Vancouver Island, supports ~80% of the world's breeding population.

Longevity: 6-10 years, max 23

Clutch Size: 1 egg annually except in the southern end of the range, where double clutching (essentially two back-to-back breeding seasons) have become common

Range: Alaska to Northern Mexico (Aleutian Islands to midway Baja California), tracking studies have shown that adult birds from Triangle Island and Haida Gwaii travel south at least as far as CA.

Conservation Status: Recently recommended for listing as a species of "Special Concern" in Canada. The U.S. population has declined sharply in some parts of the range (e.g., Farallon Islands).



Cassin's Auklet

nest in burrows on small islands by digging a hole in the soil or using natural cracks and crevices or manmade structures.



Breeders in California, Oregon and Washington are thought to stay put for the winter.

Those breeding farther north (all the way into the Aleutian Islands) appear to come south for the warmer weather.

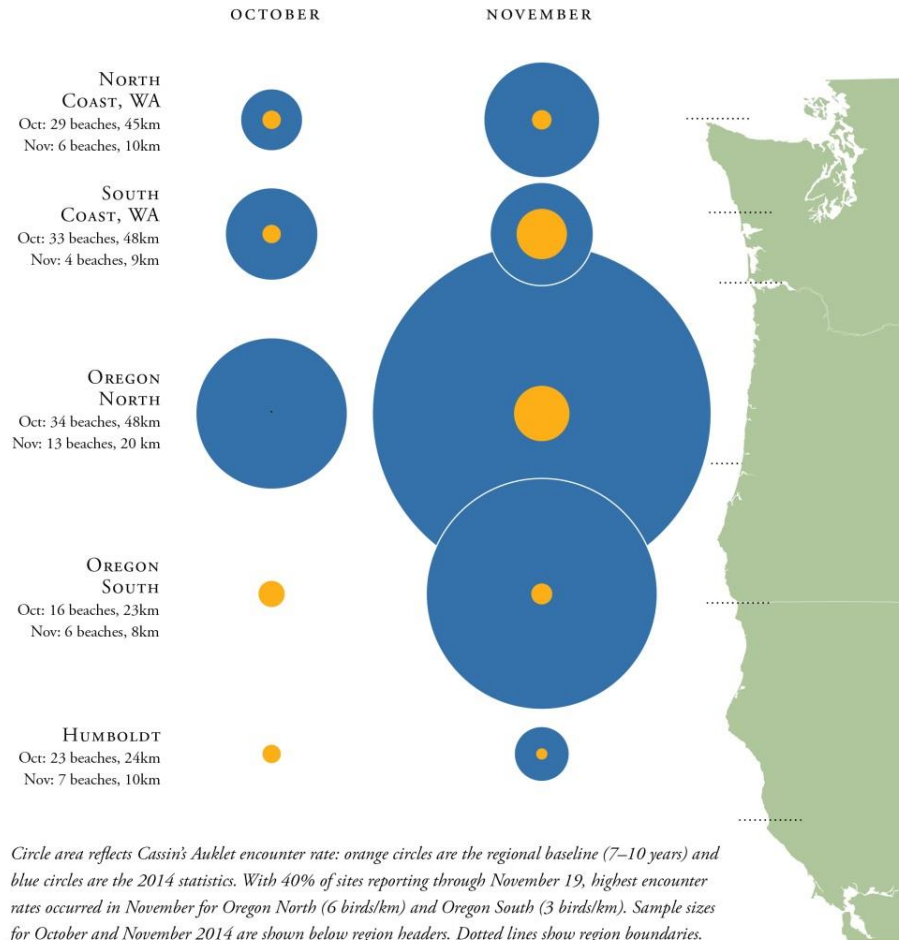
Of the approximately 50 Cassin's COASST finds each year, most occur between September and December, as worn and weary breeders make their way south.

Fall of 2014/winter 2015 **10 – 300x normal rate**

Seven organizations collectively totaling over *1,200 trained coastal residents*

- ***British Columbia Beached Bird Survey*** (BCBBS) – British Columbia, Canada
- ***Coastal Observation and Seabird Survey Team*** (COASST) – Alaska south to Mendocino County, U.S.
- ***ODFW surveys*** - Lincoln County, OR
- ***Redwood National Park*** – Del Norte to Humboldt County, CA
- ***Humboldt State University*** – Humboldt County, CA
- ***Beach Watch*** – Mendocino County to San Mateo County, CA
- ***Beach Coastal Ocean Mammal/Bird Education and Research Surveys*** (BeachCOMBERS) – San Mateo County to Los Angeles County, CA

CASSIN'S AUKLET WRECK 2014



High density reported in OCNMS
Pacific Beach 12/22/14
229 beached CAAU/km





No signs of disease, poison, or other contagion

15 Cassin's Auklets necropsied showed signs of emaciation and signs of starvation

As coastal breeders that feed along the continental shelf they are extremely sensitive to changes in the nearshore environment—during the Nestucca oil spill of 1988, Cassin's Auklets comprised nearly 1/3 of the total recorded deaths off Vancouver Island.



Though Cassin's auklets in the north had a successful breeding year, auklets breeding on the Farallon Islands largely abandoned breeding for the season.

Environmental conditions are a distinct possibility exacerbating this wreck event.

Decreased upwelling this spring/early summer shifts prey availability and/or location which has also taken its toll on Common Murres and Brandt's Cormorants this year.

MD-MAP Pilot Project

- ▷ Japan tsunami debris (2011)
- ▷ Measureable increase in debris?
 - ▷ *Baseline & shift in abundance or composition*
- ▷ Spatial and temporal variation
 - ▷ *Modeling*
 - ▷ *Power analysis*



North Coast Journal



OPRD

Marine Debris

MD-MAP Partners

~ 40 partners @
~ 150 sites

*Monthly or
Snapshot*

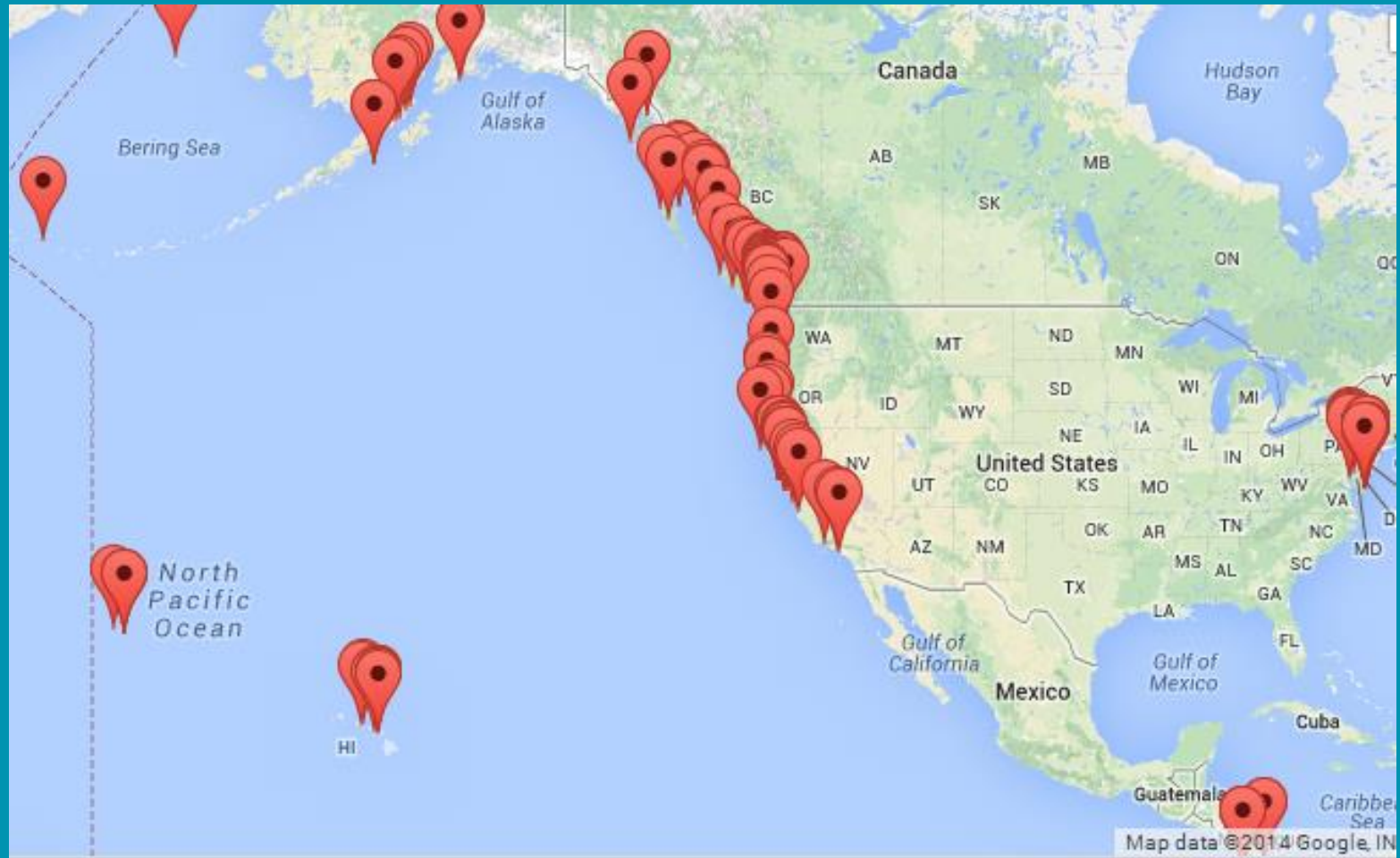
*St. stock and
accumulation*

Volunteer-based
*Training &
Communication*



Marine Debris

MD-MAP Pilot Project





7 monitoring sites:
Strait of Juan de Fuca



13 monitoring sites
Washington outer coast



2014 Marine Debris Monitoring Sites









Norwegian Memorial
Mike Tetreau, Chiggers Stokes

What material type is most prevalent?

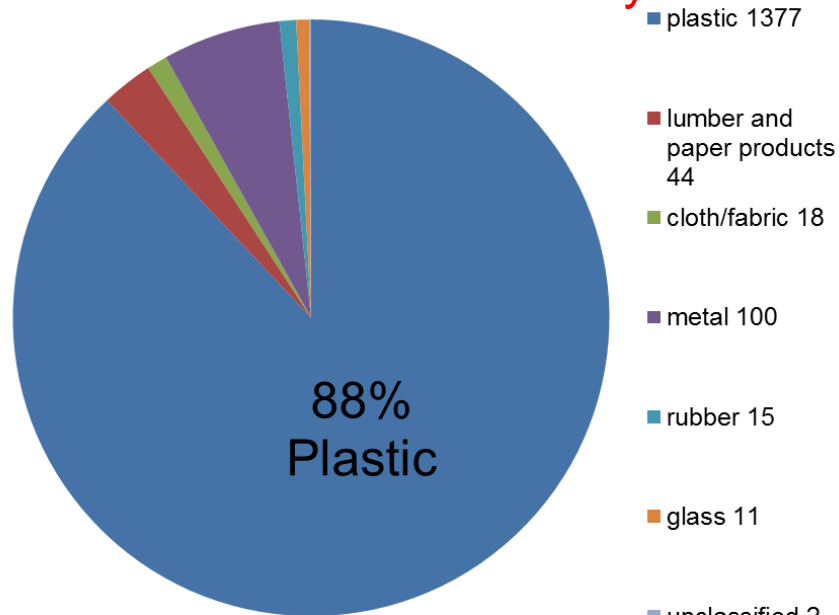
Average # of items/100m
for small marine debris (2.54cm-30cm)

Strait of Juan de Fuca

7 sites

102 surveys 1,567 pieces

15 items/100m survey

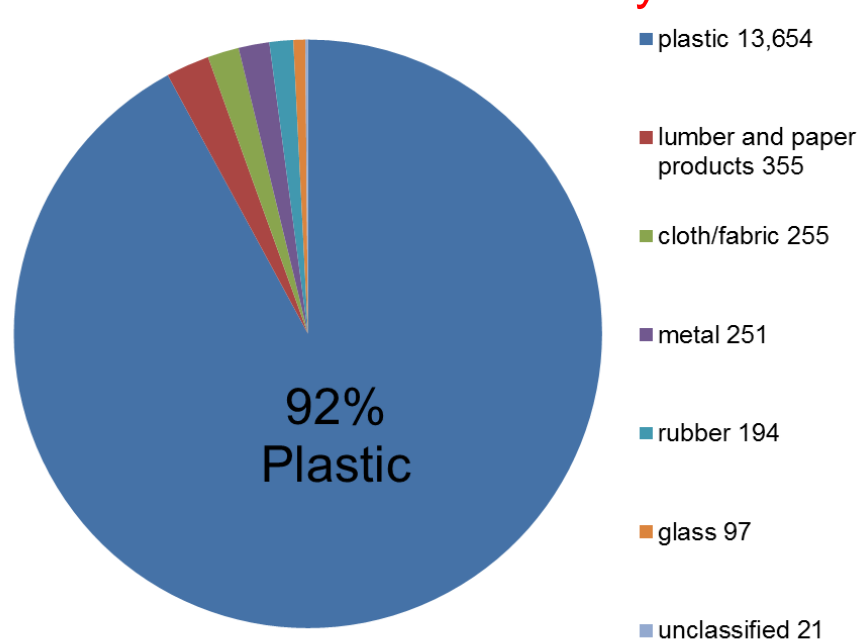


Washington Coast

17 sites

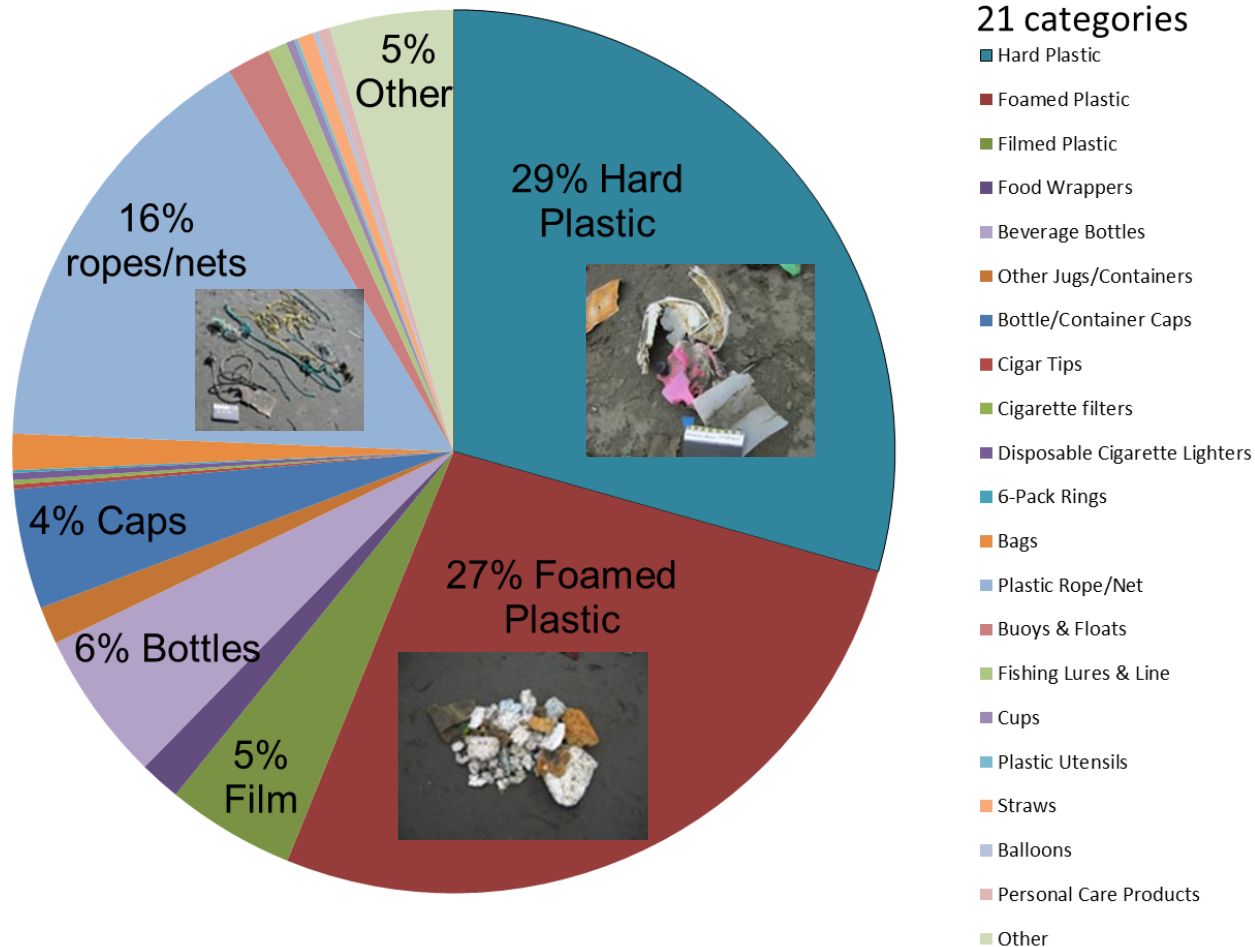
223 surveys 14,827 pieces

67 items/100m survey



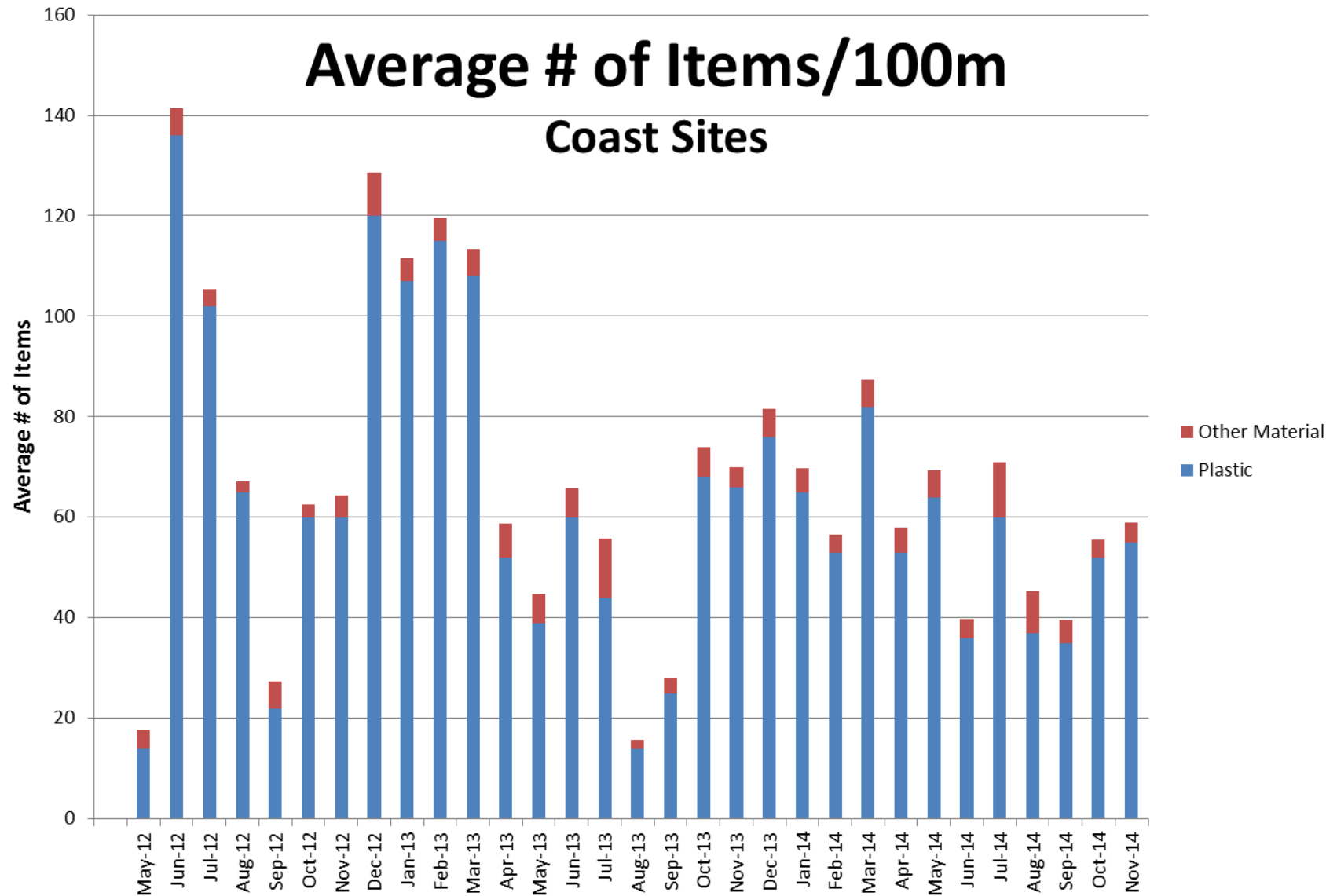
Average # of Items in Plastic Categories

of items per plastic category/# of total plastic items
9,138 items from all sites



Average # of Items/100m

Coast Sites

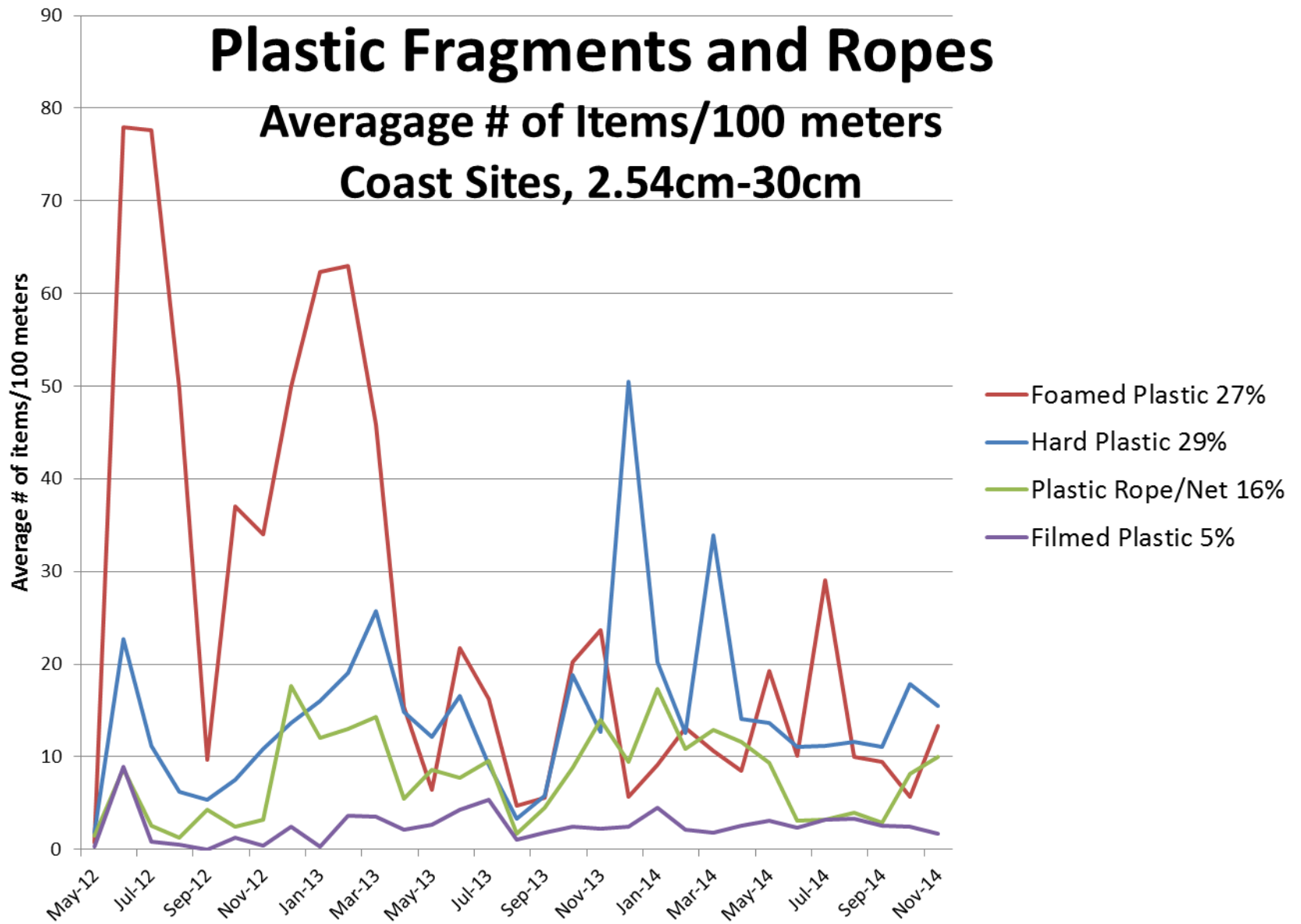


Plastic Fragments and Ropes

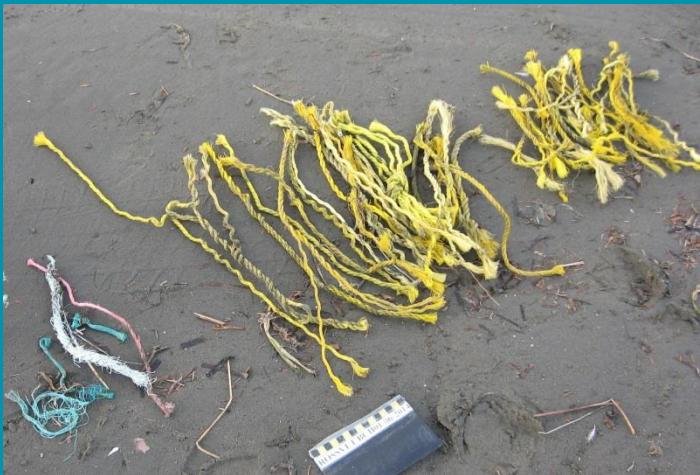
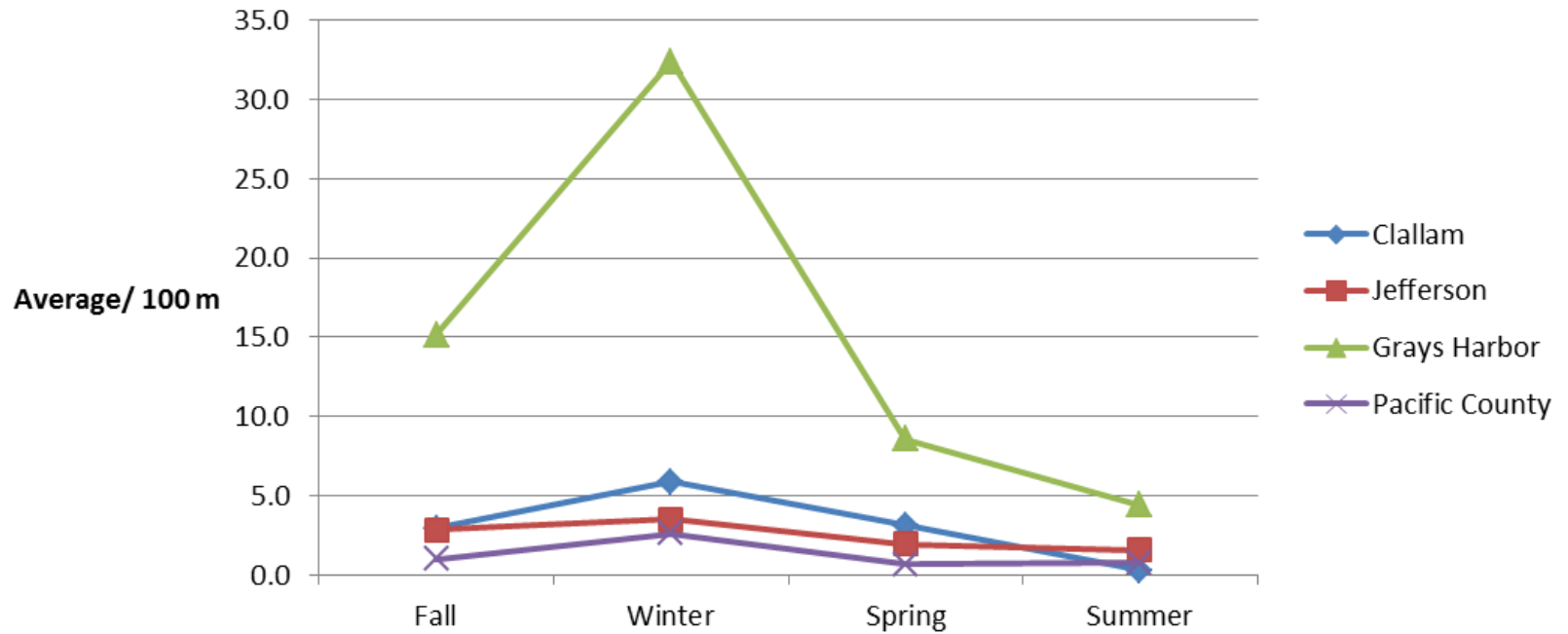
Average # of Items/100 meters

Coast Sites, 2.54cm-30cm

Average # of items/100 meters



Yellow Rope Pieces





37 short yellow ropes
In 100 meter study area



189 yellow ropes on
Hobuck Beach (1.97km)
.96/100meters





mouth of river



Mosquito Creek December 9, 2012



100m monitoring site



National Marine Sanctuaries
National Oceanic and Atmospheric Administration



NATIONAL MARINE
SANCTUARIES

OLYMPIC COAST

<http://olympiccoast.noaa.gov>